

RUNWAY SAFETY

Runway Safety

Program Office

**Airports Division
Northwest Mountain
Airports Conference**

2006

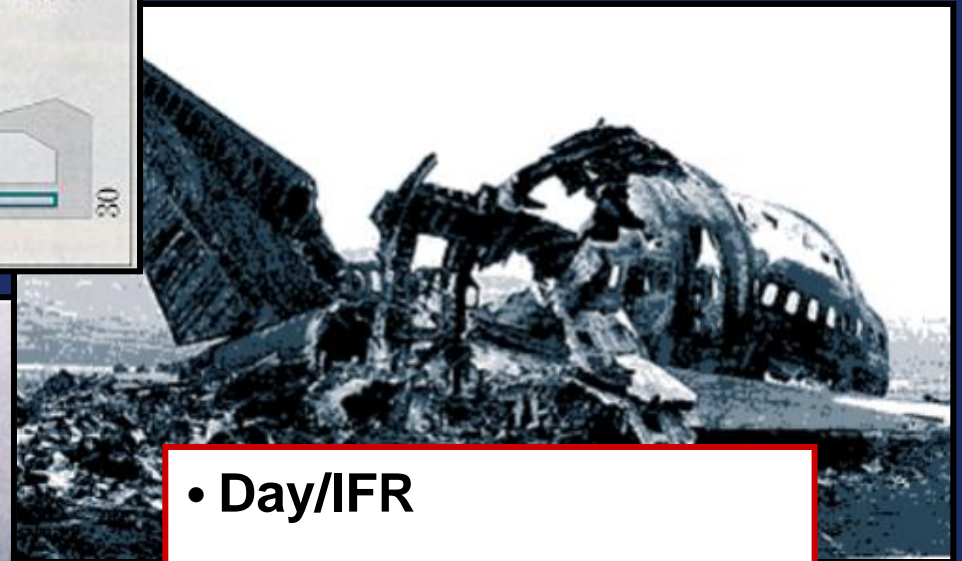
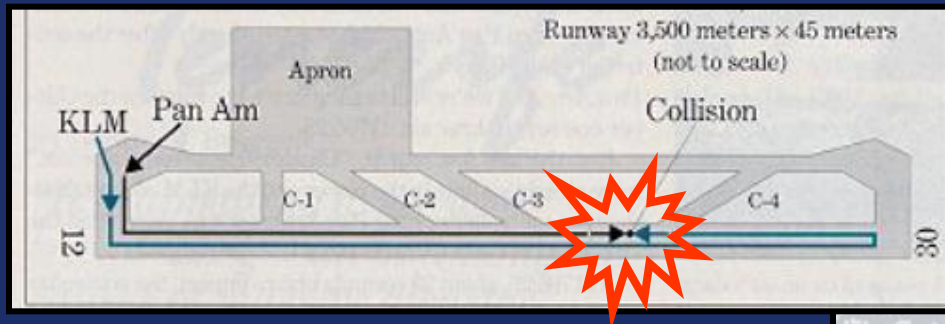


**Federal Aviation
Administration**

- 
- Runway Safety History
 - Definitions, Statistics
 - ANM Incursions
 - Runway Safety Program Activities
 - Regional Safety Action Plans
 - Risk Reduction
 - Best Practices
 - Design Considerations
 - Communication/Collaboration

Los Rodeos Airport Tenerife, Canary Islands, March 27, 1977

Taxiing aircraft collided with takeoff aircraft on same runway



- Day/IFR
- Weather - Light Rain
- Visibility - Restricted; Fog & Low Clouds



The worst accident in aviation history occurred in 1977 when two 747 aircraft collided on a runway in the Canary Islands killing 583 passengers

Mexico City October 31, 1979



Pilot lands on closed runway. There were 79 fatalities.

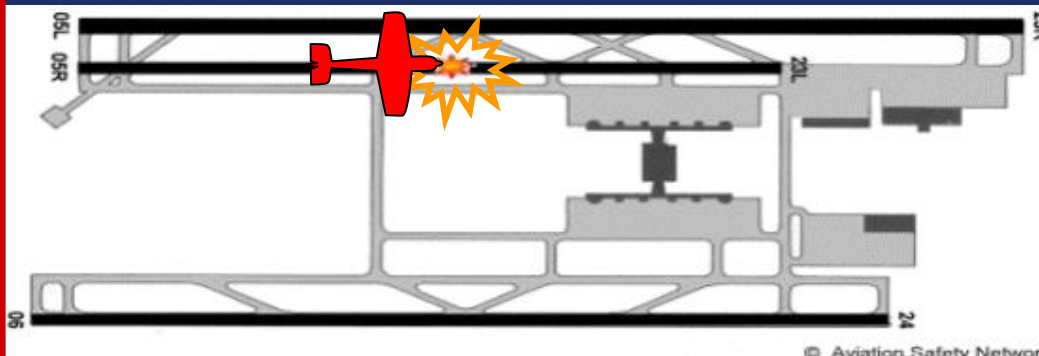
Los Angeles International Airport, November 1991

- Night/IFR
- Visibility - Unrestricted

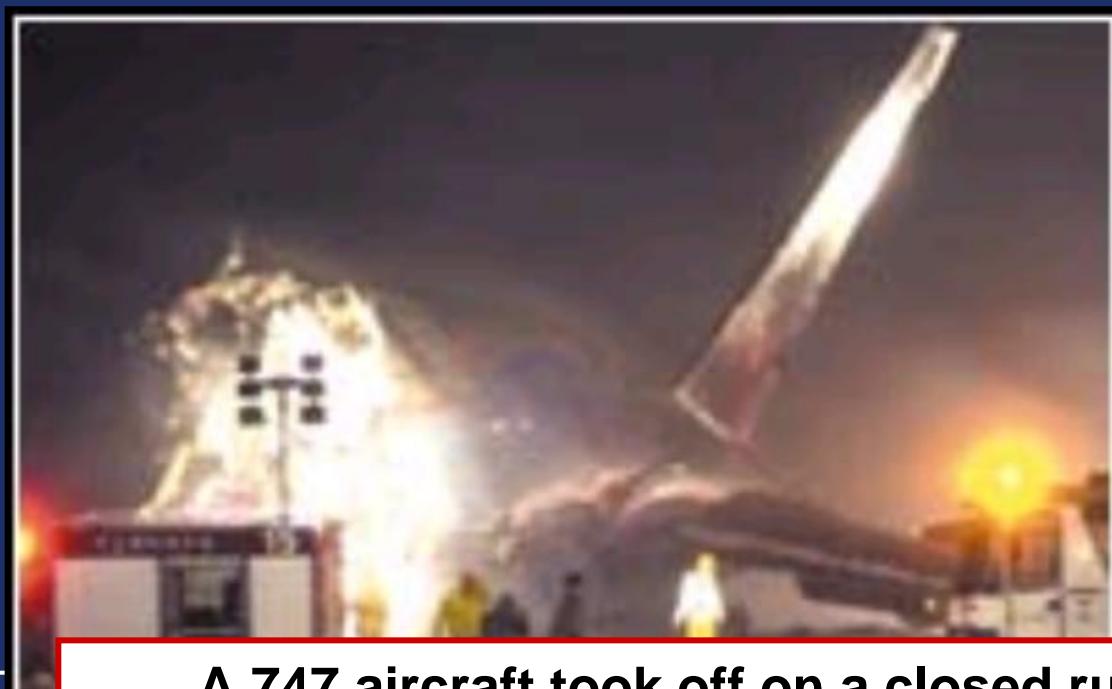
**Commuter aircraft was in position on the runway,
awaiting clearance, in front of a landing 737.
There were 34 fatalities.**

Taipei's Chang Kai Shek International Airport, October 31, 2000

- Night/IFR
- Weather - Heavy Rain
- Visibility - 600 meters
- Typhoon in area



Aircraft impacted equipment
on closed runway during takeoff



A 747 aircraft took off on a closed runway and
collided with construction equipment killing 83 onboard



Linate Airport, Milan, Italy October 8, 2001

A Citation strayed onto a runway in Milan, Italy and collided with an MD-80 during its takeoff roll. There were 122 fatalities



- Day/IFR
- Visibility - Restricted; Fog



The Beat Goes On...

Between January 1990 and February 2005 there have been 15 runway collision accidents in the United States that claimed 68 lives and damaged 24 aircraft.



Uncontrolled Fields



Federal Aviation
Administration

Uncontrolled Fields



Federal Aviation
Administration

Uncontrolled Fields



Federal Aviation
Administration



Administration

Uncontrolled Airports



Federal Aviation
Administration

Surface Incident - Defined



Any event where unauthorized movement occurs on the Movement Area that affects or could affect the safety of flight.



Runway Incursion - Defined



- Runway Incursions are defined as any occurrence in the airport runway environment involving an aircraft, vehicle, persons or object on the ground that creates a collision hazard or results in a loss of separation with an aircraft taking off, intending to takeoff, landing or intending to land.



Types of Runway Incursions

- The FAA investigates runway incursions and attributes the occurrence to one or more of the following error types:

Operational Errors

- An operational error (OE) is an action of an Air Traffic Controller (ATC) that results in:
 - Less than the required minimum separation between two or more aircraft, or between an aircraft and obstacles (obstacles include vehicles, equipment, and personnel on runways).
 - An aircraft landing or departing on a runway closed to aircraft.

Pilot Deviations

- A pilot deviation (PD) is an action of a pilot that violates any Federal Aviation Regulation. For example, a pilot fails to obey air traffic control instructions to not cross an active runway when following the authorized route to an airport gate.

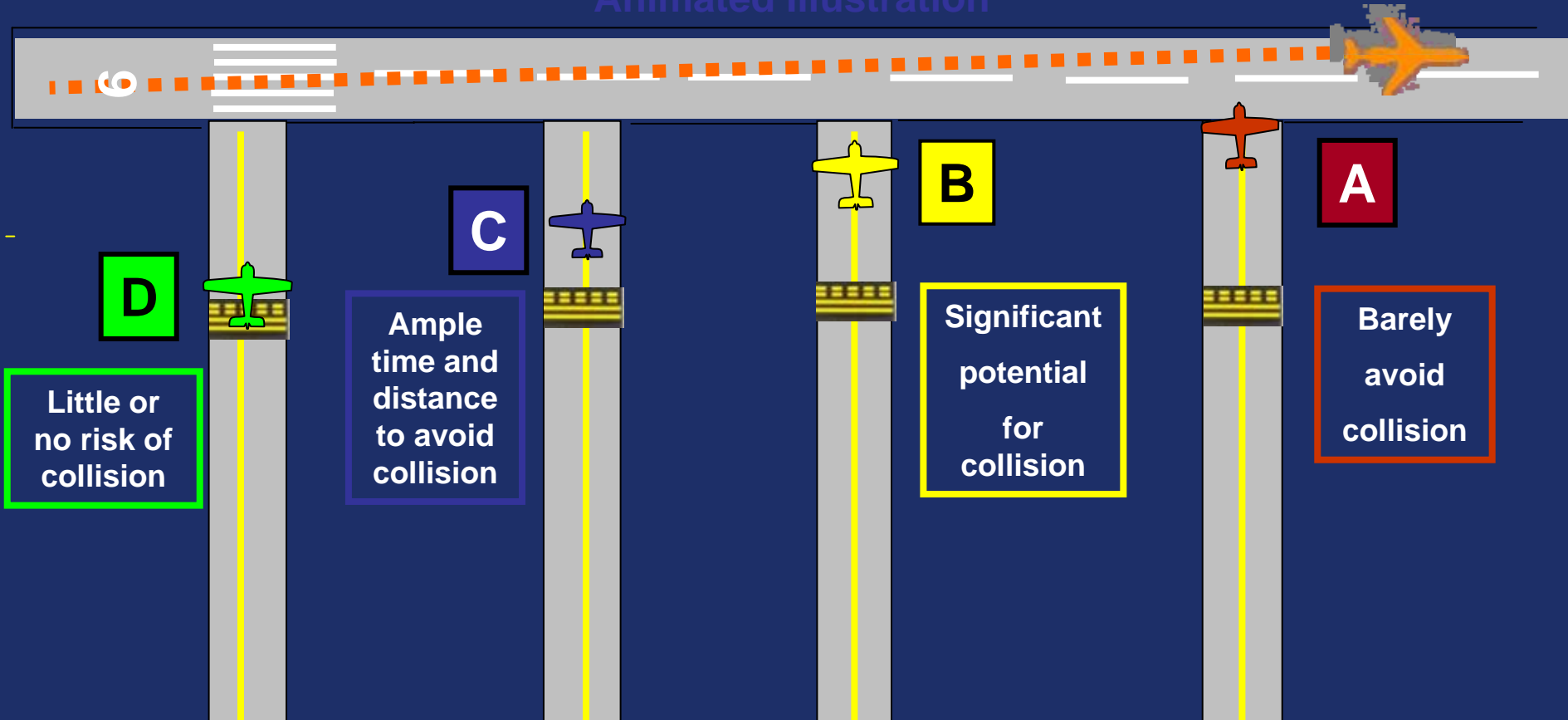
Vehicle/Pedestrian Deviations

- A vehicle or pedestrian deviation (V/PD) includes pedestrians, vehicles or other objects interfering with aircraft operations by entering or moving on the runway movement area without authorization from air traffic control.



Severity Categories

Animated Illustration



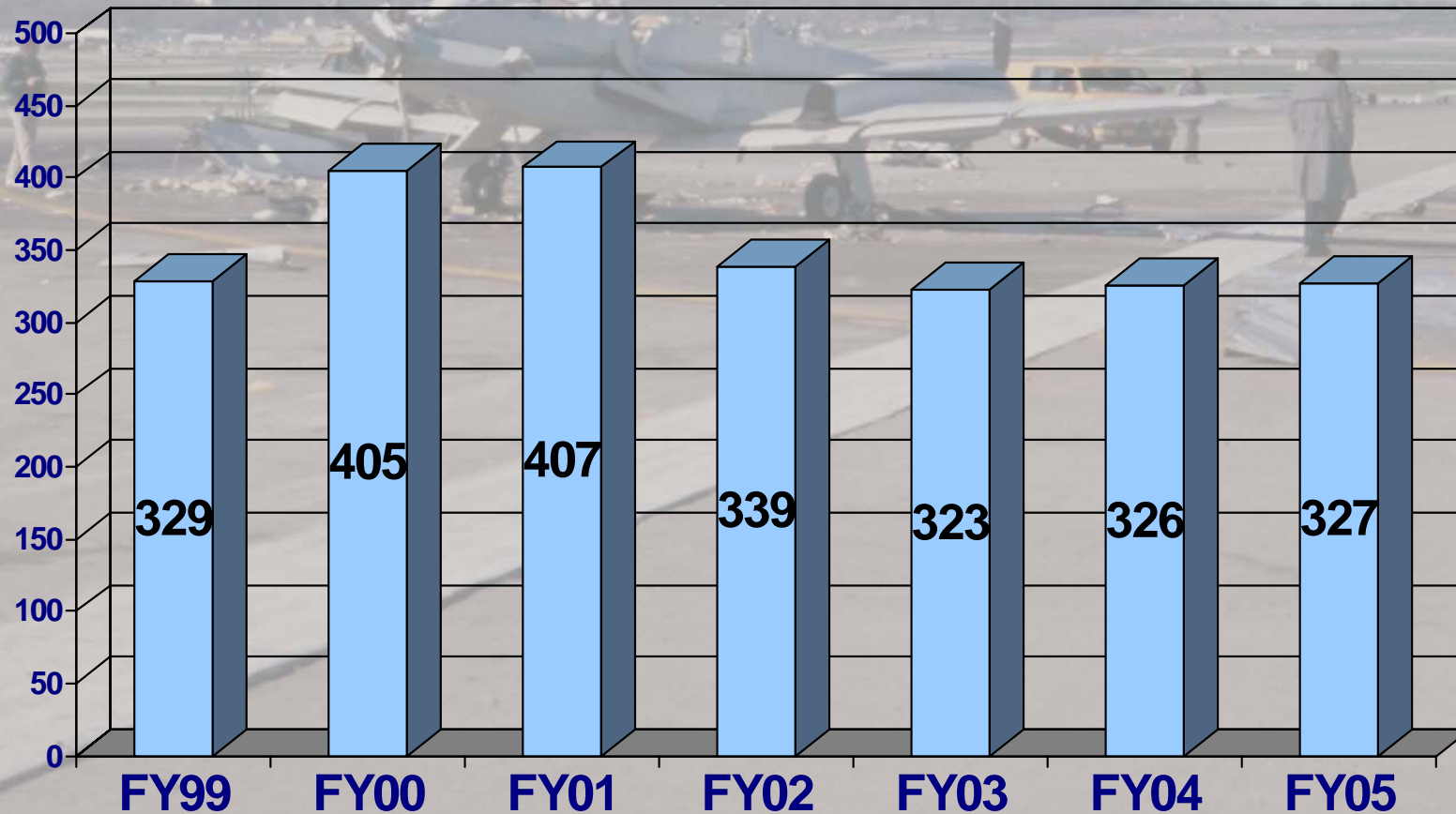
Above scenarios are all classified as runway incursions, but with different severity codes.

- In each case the taxiing aircraft penetrated the runway safety area (hold position) AND
- A collision hazard or loss of separation occurred with the landing aircraft

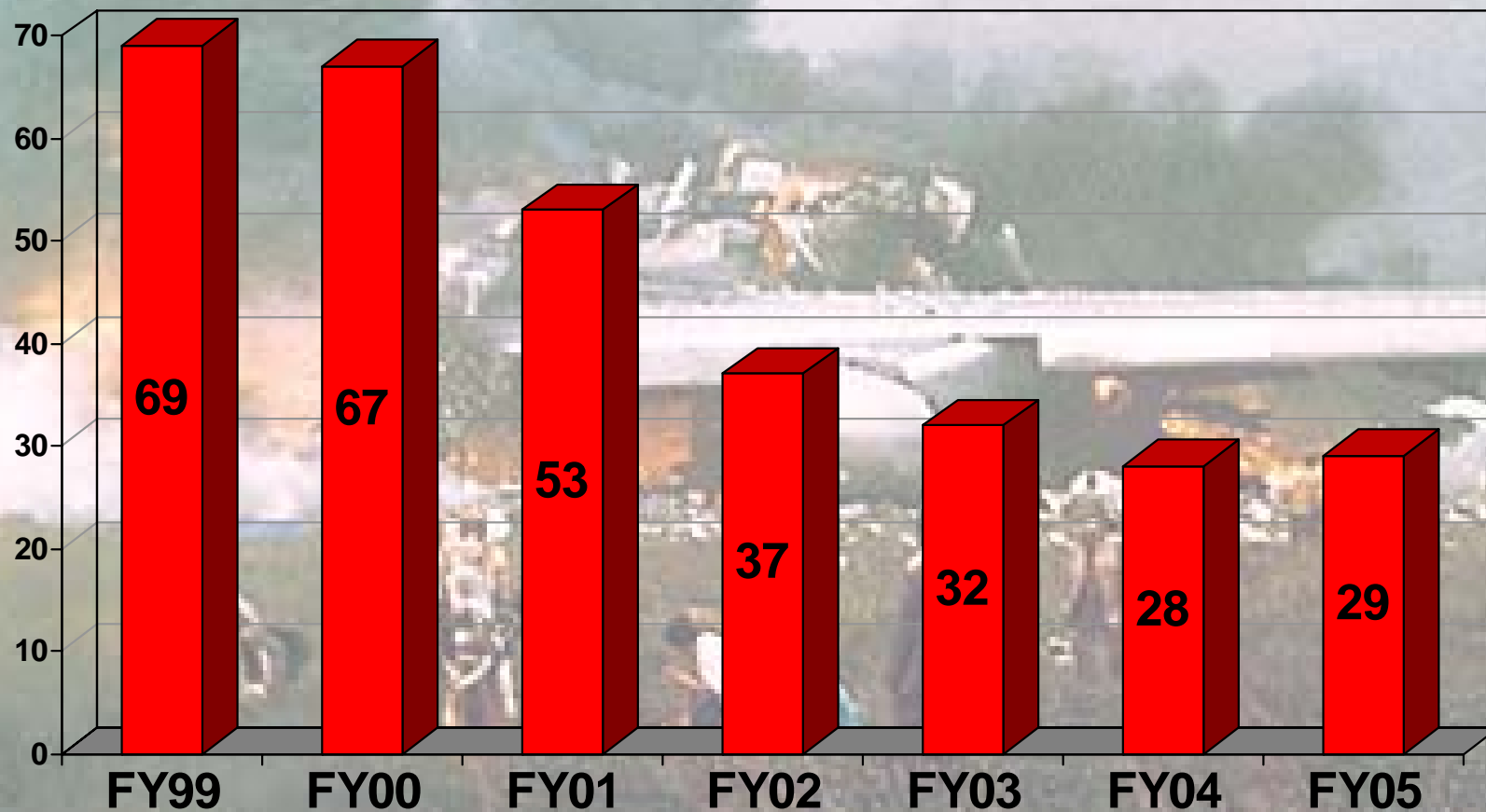


Federal
Adminis on

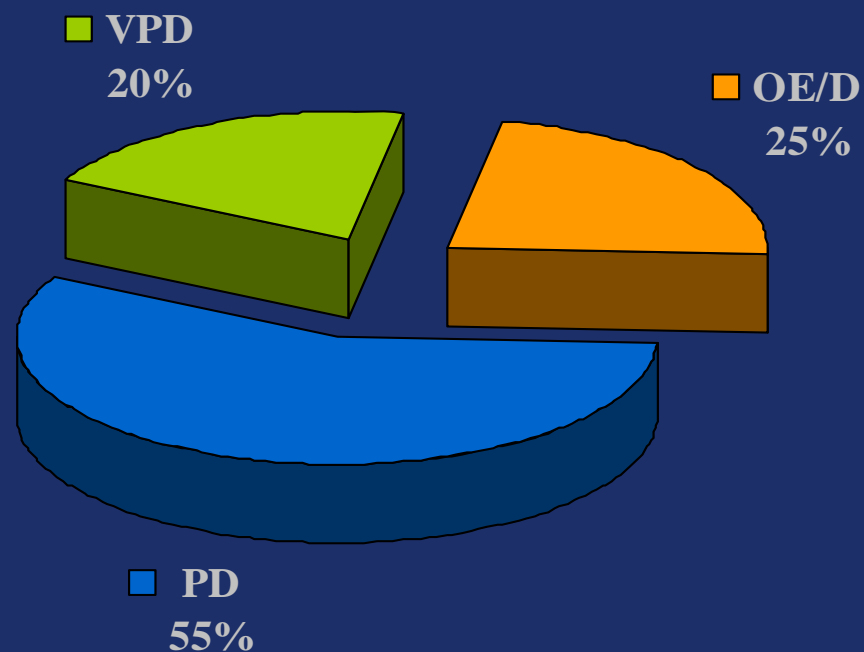
National Runway Incursions (All Categories)



National Runway Incursions (Categories A&B)



RI Distribution by Type

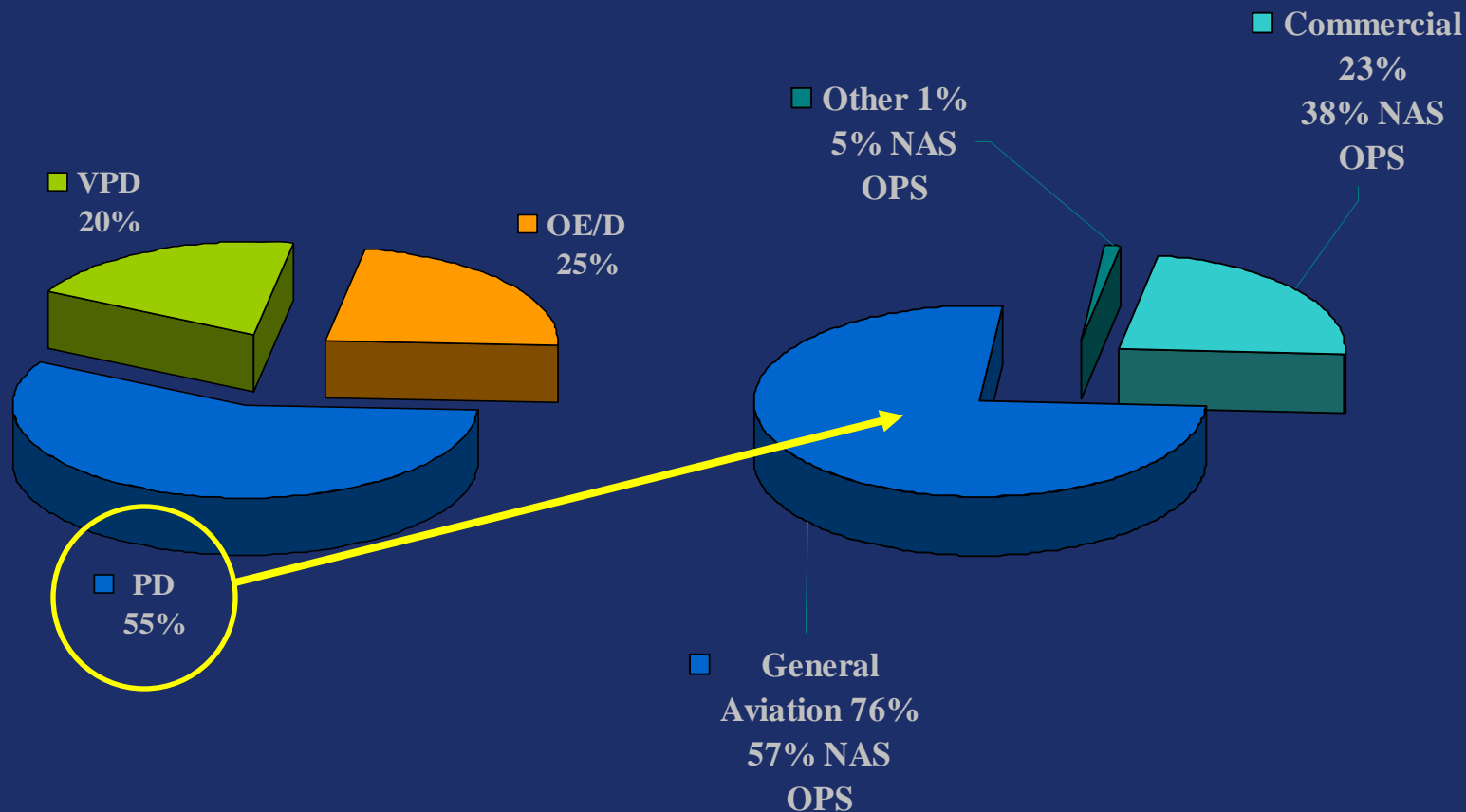


FY 2001-2004



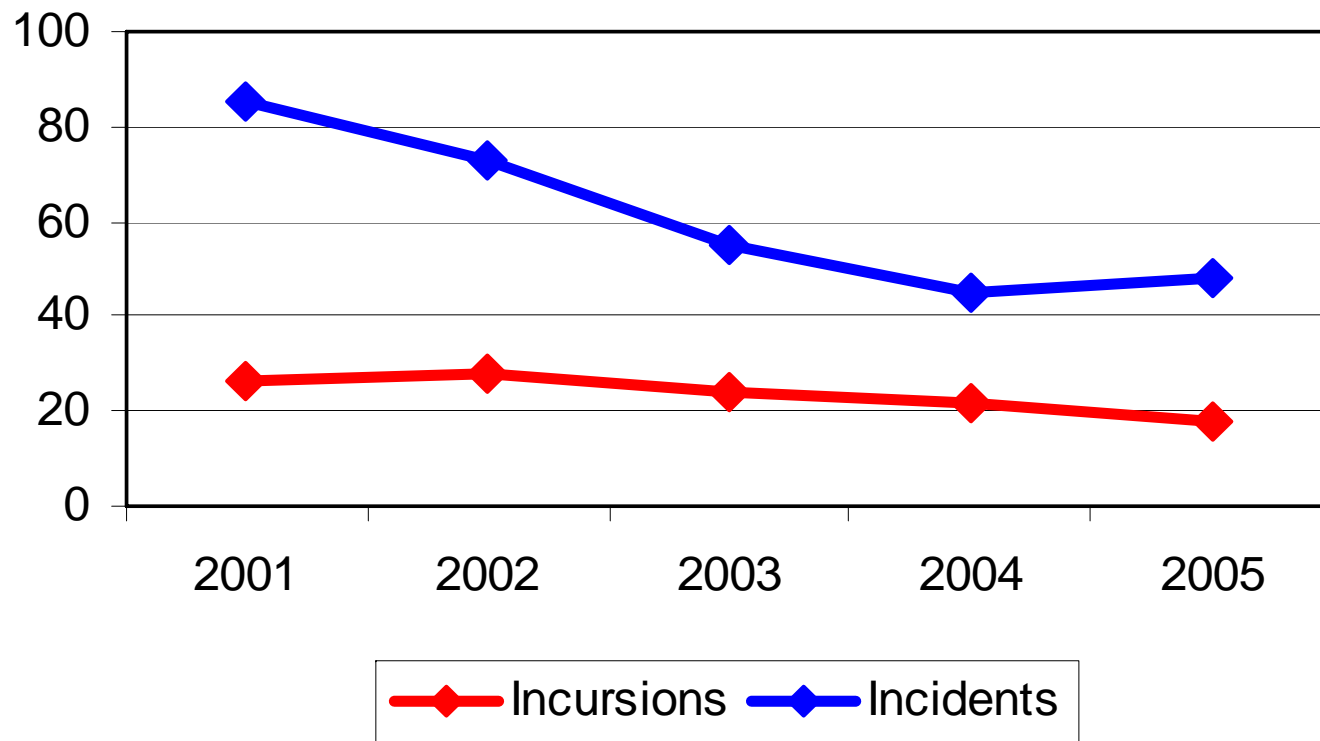
Federal Aviation
Administration

Pilot Deviation Distribution by Type of Operations

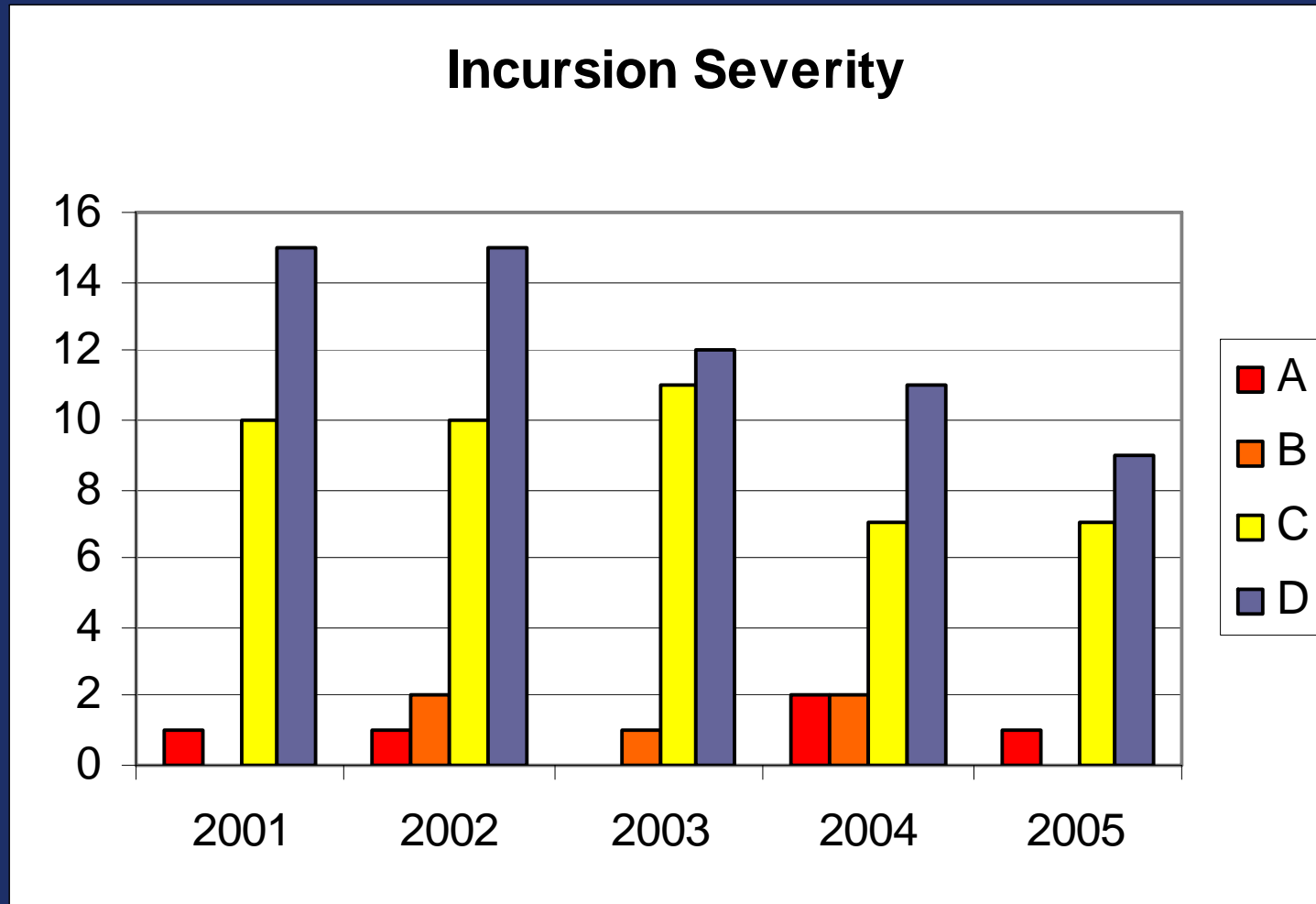


Northwest Mountain Region Incident Statistics

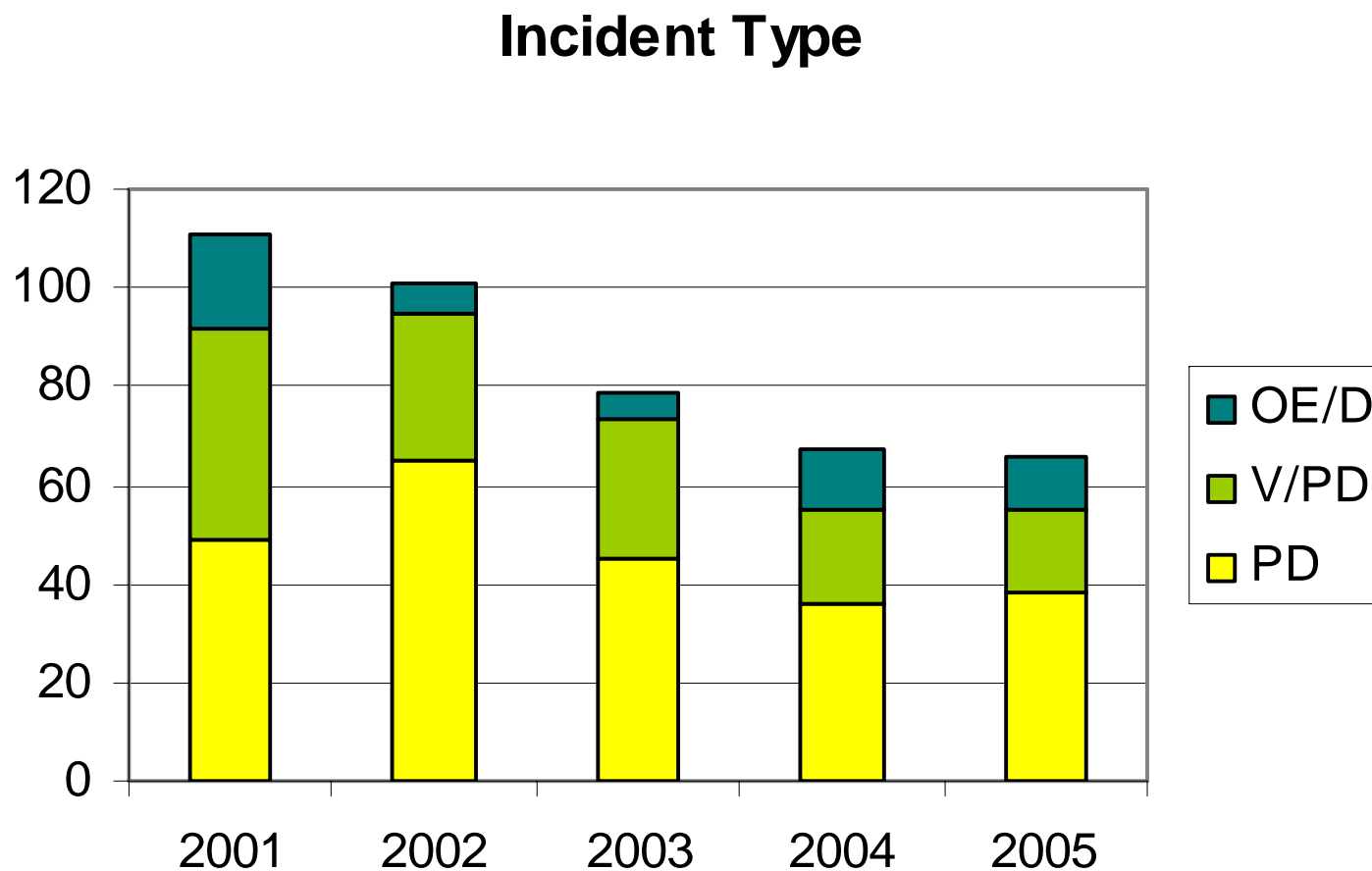
Region Incidents/Incursions by Year



Northwest Mountain Region Incident Statistics

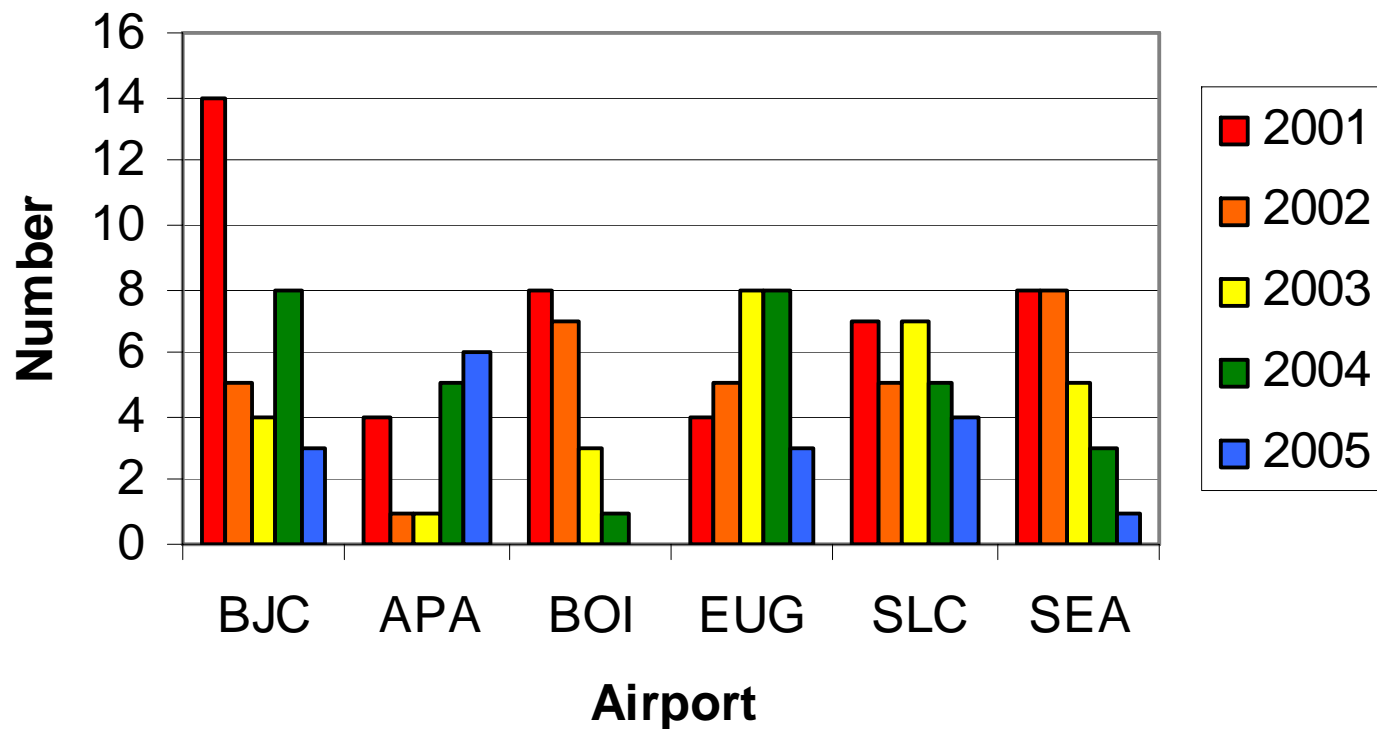


Northwest Mountain Region Incident Statistics



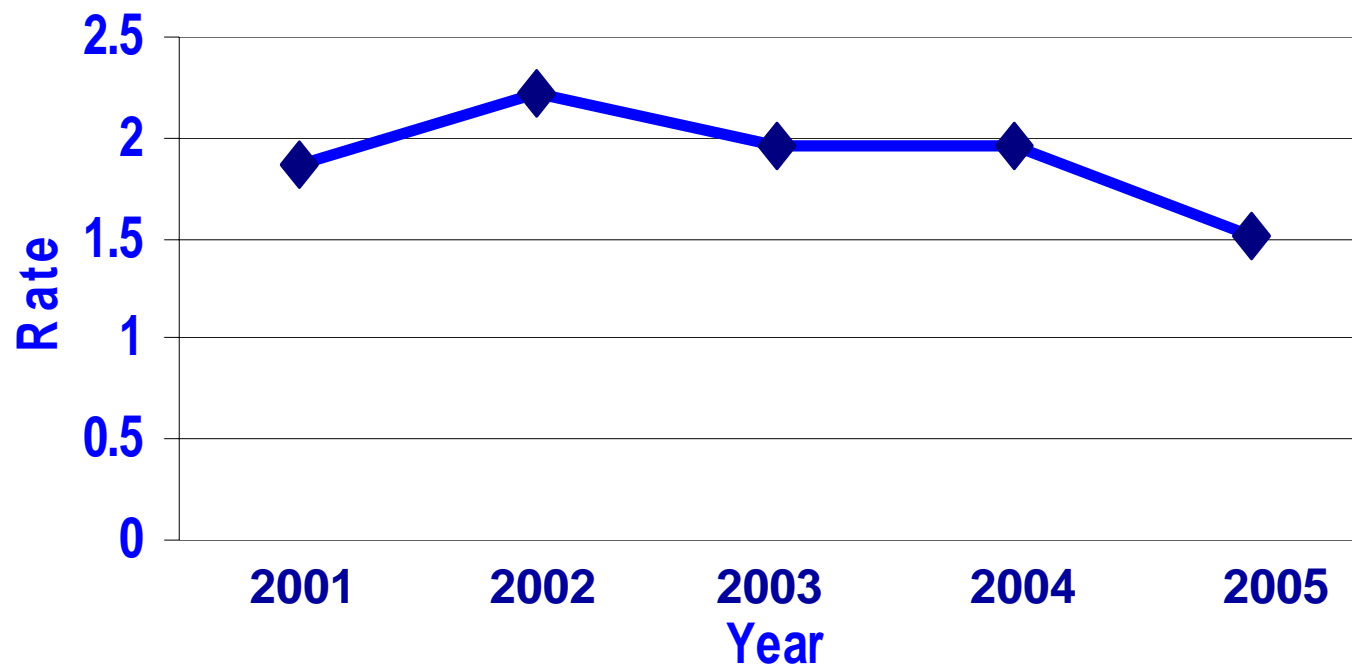
Northwest Mountain Region Incident Statistics

Surface Incidents by Year



Northwest Mountain Region Incident Statistics

Incursions per million ops



What Is the FAA doing in our Region to reduce Surface Incidents?

- ▶ Improving Airports (RAP)
- ▶ Improving Training Programs
- ▶ Applying New Technology
- ▶ Improving Communications
- ▶ Refining Standard Operating Procedures



Regional Runway Safety Activities

- **Runway Safety Action Meetings**
- **Pilot Meetings**
- **Safety Assessments**
- **Information Brochures**
- **Conferences**
- **Mechanic Seminars**
- **Airport Management Seminars**
- **State Aviation Partnerships**
- **Airport Project Reviews**



Runway Safety Action Team Meeting

- **Pre-RSAT Visits**
 - ATCT, AF, and FBO(s)
- **Daylight and Night Time Airfield Tour**
 - First-hand look at actual or potential problem areas
- **Meeting with Local Stakeholders**
 - Consensus on any necessary actions



Runway Safety Action Items 2005,6

- Action Items Developed - **94**
- Action Items Completed - **54**
- Safety Recommendations to non-towered airports - **81**



Runway Safety Action Items

- Signs and Marking
- Training
- Publications, Information
- Hot spot brochures
- Access
- Navaids
- Light shielding
- Runway Incursion Device (RID)
- Confusing pavements



Northwest Mountain Region Runway Safety Recommendations

Operations and Maintenance



SHIELDING RAMP LIGHTS TO IMPROVE TOWER CAB VISIBILITY



WELL DEFINED MOWING PLANS & PROCEDURES INCLUDING SPECIFIC AREA “DESIGNATIONS”



EMERGENCY RESPONDER TRAINING PROGRAM



MAXIMIZE CONTROLLED ACCESS TO THE AIRFIELD *(includes wildlife)*



INFORM THE PUBLIC



OPPOSITE FLOW RUNWAY INSPECTIONS

Runway Inspections should be conducted **TOWARDS** the flow of aircraft landing and departing as much as possible



HIGH VISIBILITY VEHICLES – INCREASING CONSPICUITY FOR PILOTS, CONTROLLERS AND OTHER DRIVERS OPERATING ON THE AOA



INSTALL AND/OR REMOVE ADDITIONAL SIGNS, INCLUDING SURFACE PAINTED, AND MARKINGS TO ELIMINATE CONFUSION



PREVENTING POTENTIAL VISIBILITY RESTRICTIONS – *Airfield Maintenance*



SIGNAGE AT ALL VEHICLE ENTRY POINTS TO THE AOA AND RUNWAY SAFETY AREAS



CLEARLY MARK ILS CRITICAL AREAS, and RUNWAY SAFETY AREAS



INSTALLATION OF ELEVATED RUNWAY GUARD LIGHTS (ERGL's) AT KNOWN HOT SPOTS AND MAJOR INTERSECTIONS



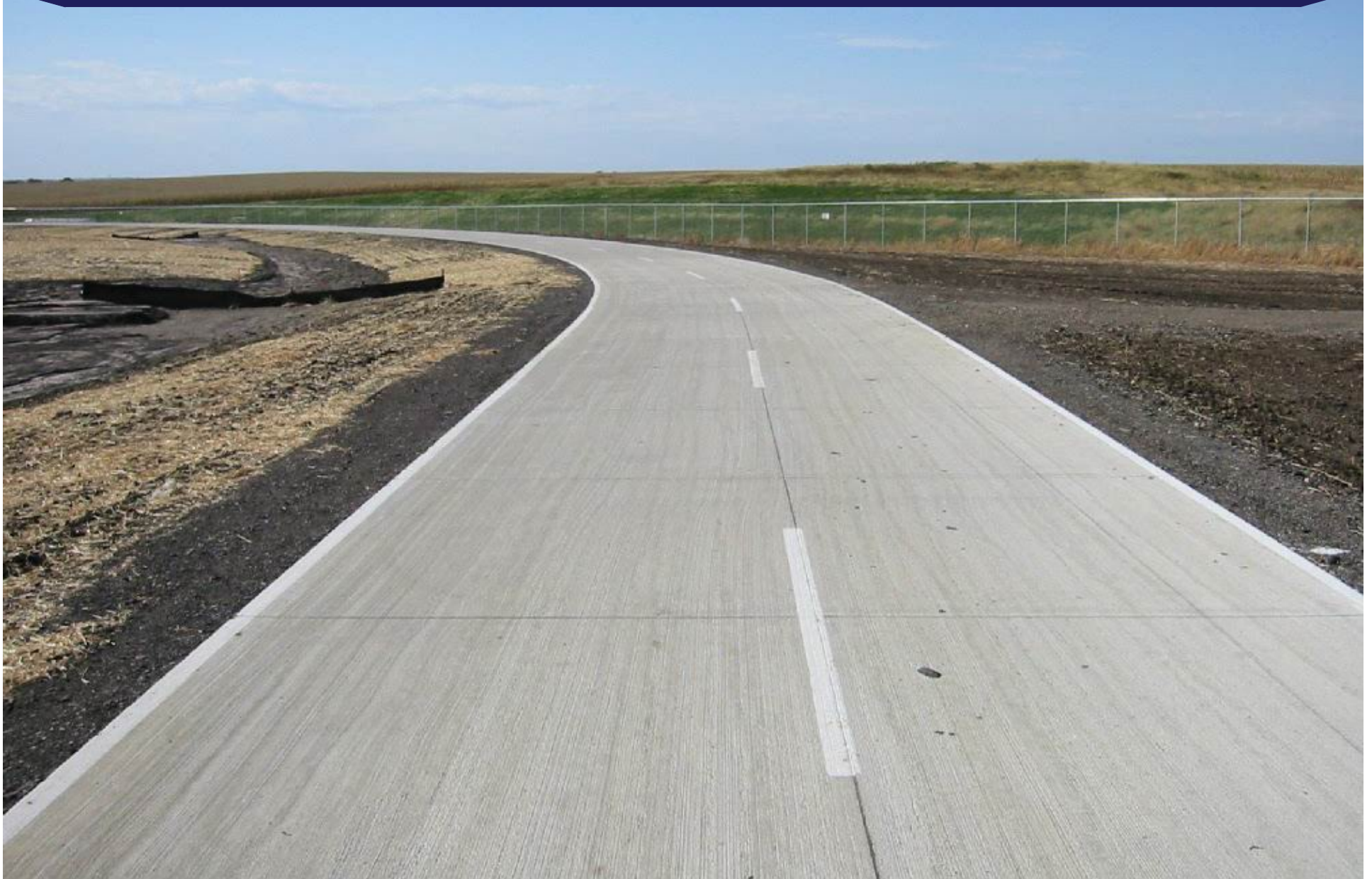
IN-PAVEMENT RUNWAY GUARD LIGHTS (IRGLS)



DRIVER TRAINING AND RECURRENCY TRAINING/TESTING



SERVICE ROADS THAT CIRCUMNAVIGATE THE ENTIRE AIRPORT



MAXIMUM USE OF SERVICE ROADS AND ACCESS GATES TO REMAIN CLEAR OF RUNWAYS AND TAXIWAYS





Recommended that the airport re-paint the
runway hold-lines.



Install a Runway hold sign at the
ramp



Re-paint the hold line on the center stub
taxiway 03/25/2005



Repaint the runway centerline white

03/25/2005



Paint hold lines on the taxiway and install
reflective runway hold signs



Control Vehicle Access

Airport Security





Airport Maintenance



Federal Aviation
Administration

Northwest Mountain Region Runway Safety Recommendations

Design Considerations



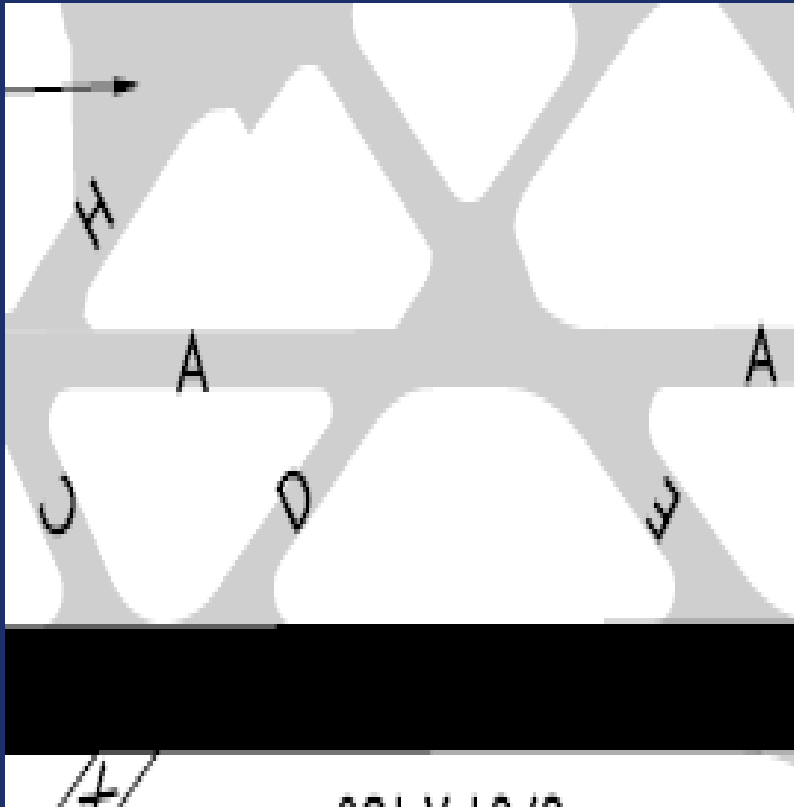
Design considerations

Keep taxiway intersections simple by reducing the number of taxiways intersecting at one point

Complex intersections increase the possibility of pilot confusion and error. Adding more taxiways creates more pavement area, which will limit the effectiveness of the taxiway signage and lighting.



Reduce number of taxiways in a single intersection



Design considerations

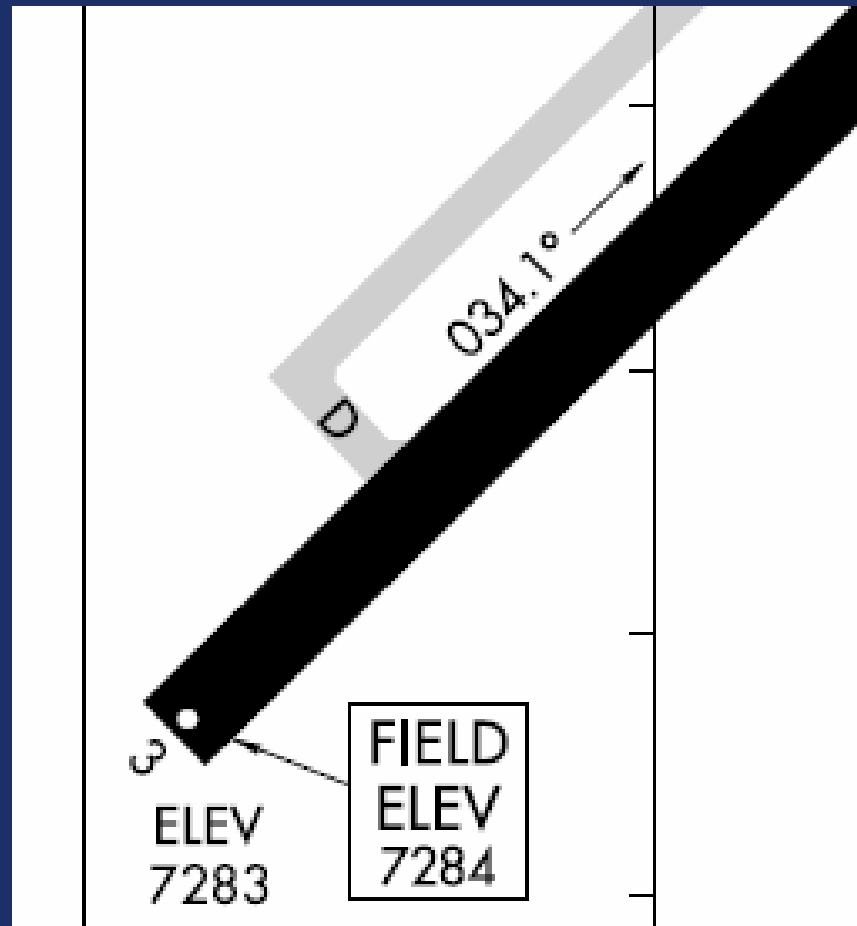
Construct full parallel taxiways to the runways where they can be justified through airport planning

Full parallel taxiways provide a standard routing of aircraft to and from the runway which is recognizable to the pilots.





Provide complete parallel taxiway when feasible



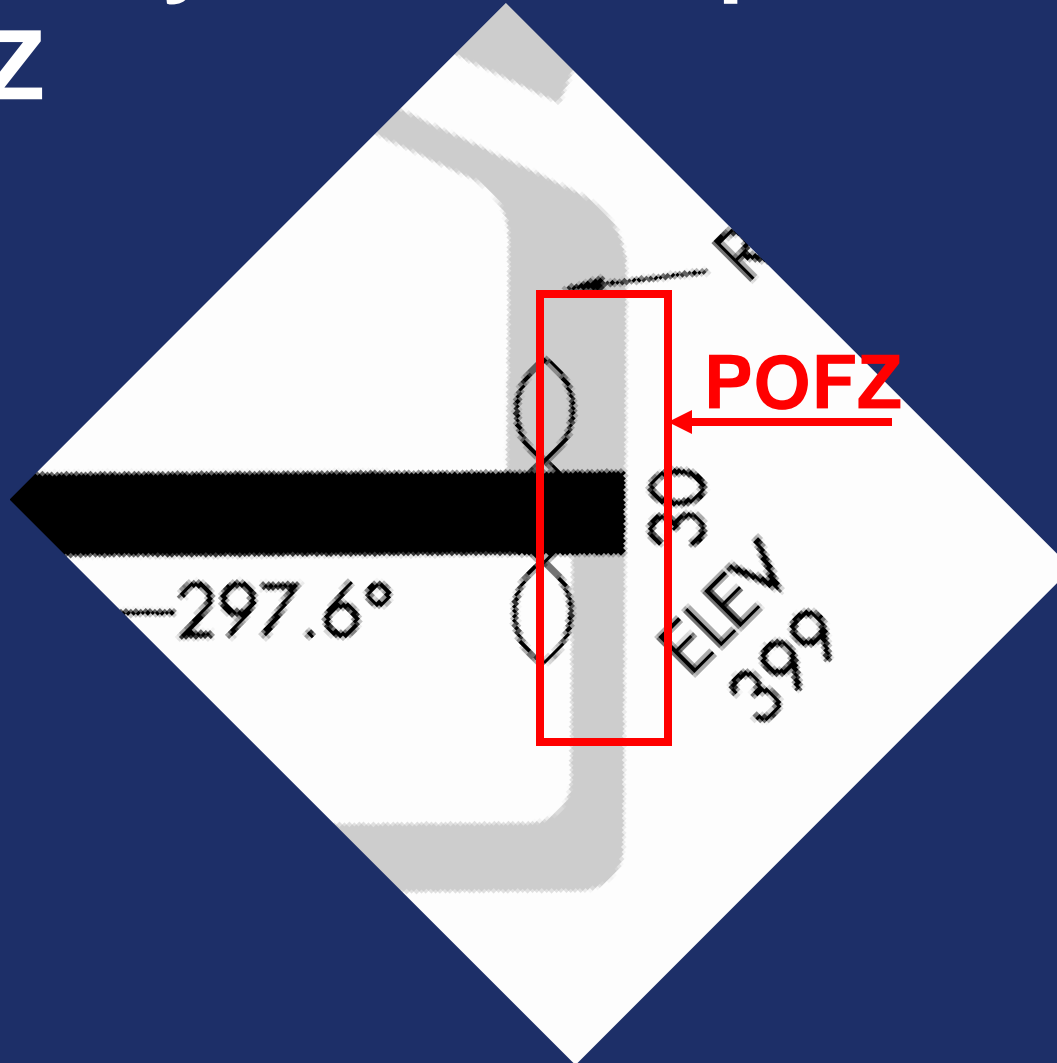
Design considerations

Provide a greater separation between the runway and parallel taxiway or avoid displacing landing thresholds (whenever possible) with approach visibility minima below $\frac{3}{4}$ mile and 250ft. HAT

Precision Obstacle Free Zone (POFZ) and the TERPs “W” Surfaces



Avoid layout that requires hold in POFZ



Design considerations

Avoid wide pavement areas such as expansive intersections or departure holding areas at runway ends that extend through the Runway Holding Position location

Wide pavement areas at any intersection force signage and edge lighting to be too far from the taxiway centerline, increasing the probability that these guidance cues will not be seen by pilots.



Avoid expansive paved areas



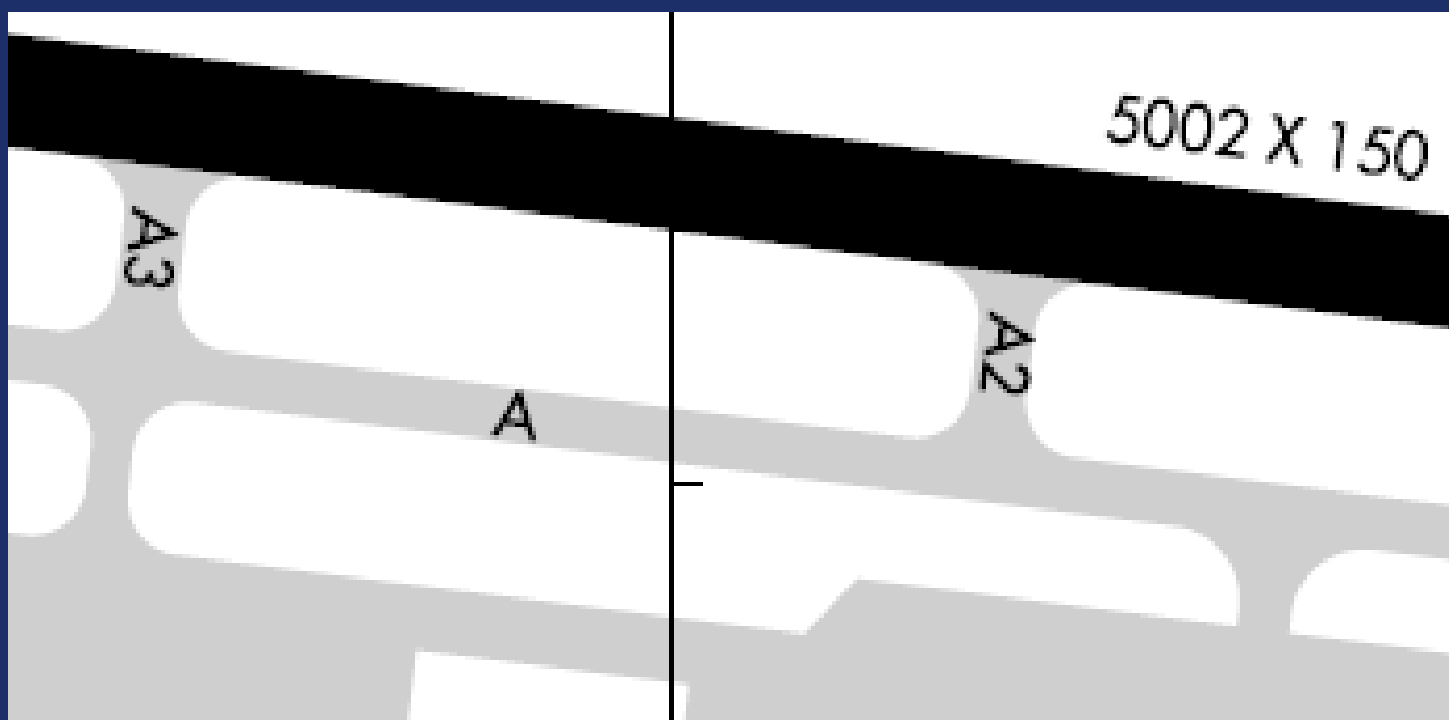
Design considerations

Avoid taxiway layouts that provide a straight direct access onto a runway

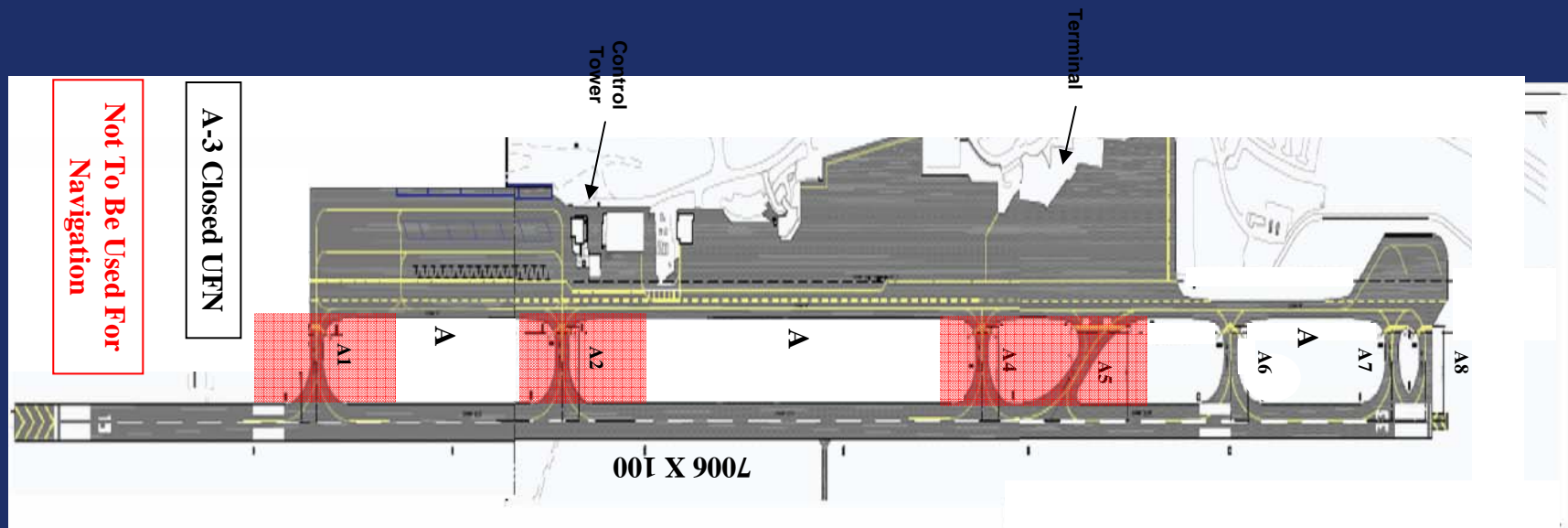
Taxiway geometry should promote situational awareness by forcing the pilot to consciously make turns. Especially troublesome are taxiways from the terminal area that form a straight line to the midsection of a runway.



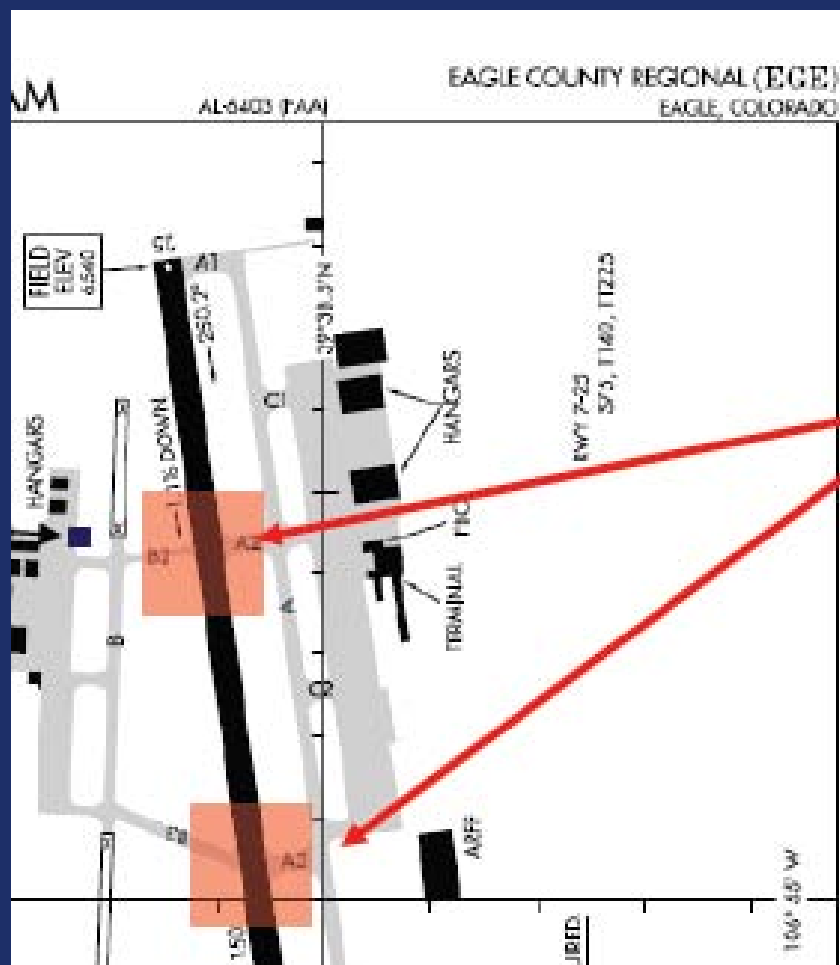
Avoid taxiways going directly from apron to runway



Avoid taxiways going directly from apron to runway



Avoid taxiways going directly from apron to runway



High Alert Areas

Be alert when conducting taxi operations in these areas due to the proximity to the runway, especially during low visibility conditions. If disoriented contact ATC immediately.

RUNWAY SAFETY
Everyone's Responsibility
Stay Alert!

Federal Aviation Administration
Northwest Mountain
Office of Runway Safety and Operational Services



Federal Aviation
Administration

Design considerations

Name taxiways by location rather than by route or purpose

Avoid taxiway nomenclature that assigns a single name to all segments of a taxiway that makes several turns along its route. Situational awareness is enhanced when the taxiway designation relates to position on the airfield, rather than route.



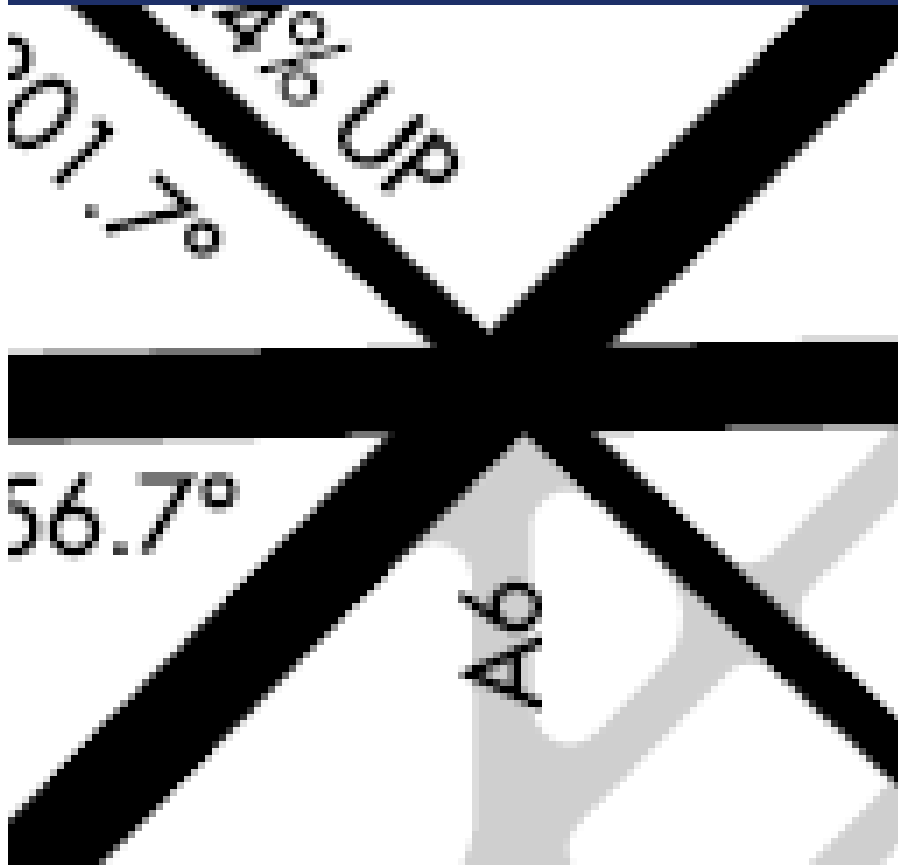
Design considerations

Taxiways should not cross the intersection of two runways

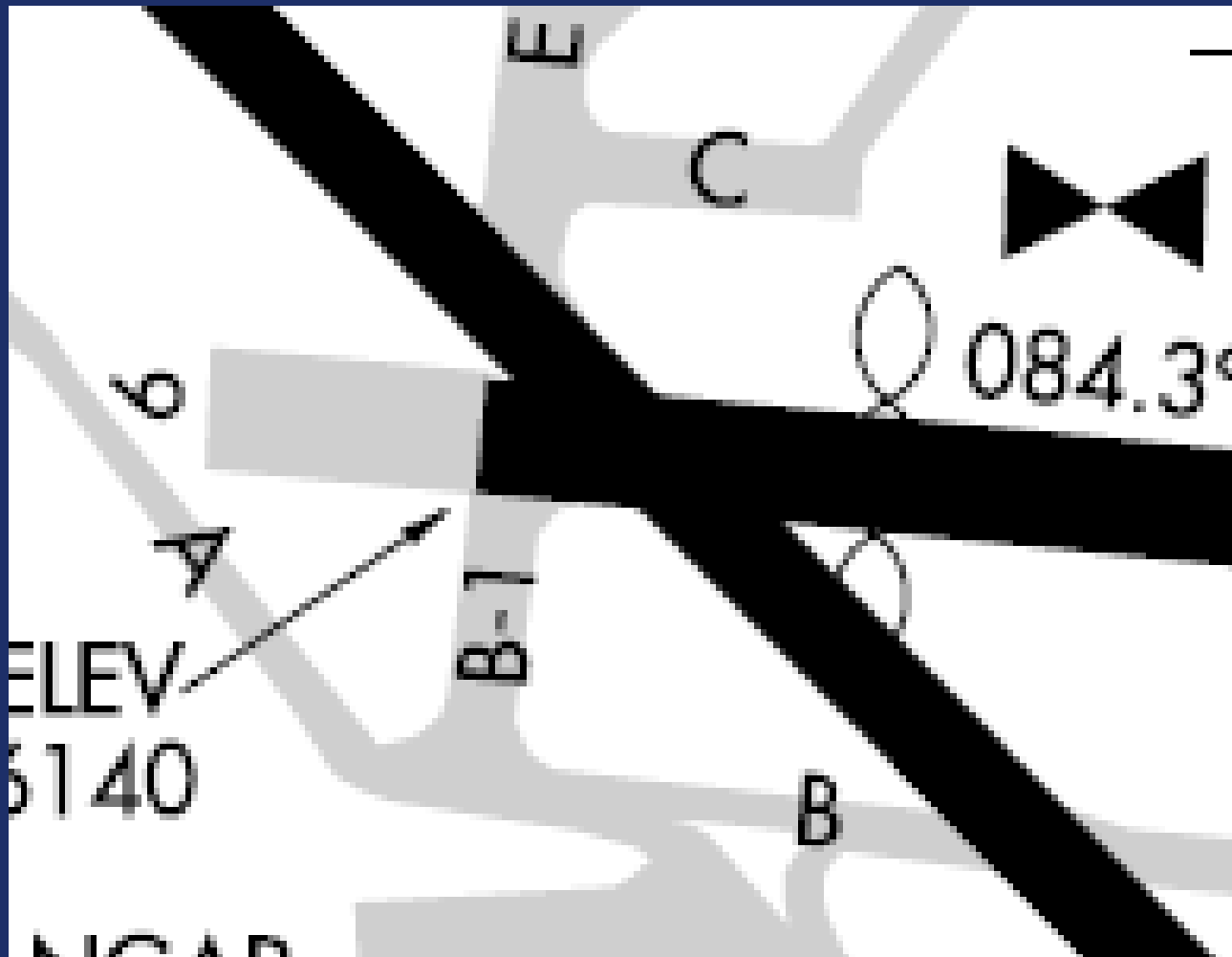
This creates a large expanse of pavement that makes it difficult to provide proper signage, marking and lighting and can disorient pilots



Avoid taxiway into multiple-runway intersection



Avoid taxi entrances to two runways



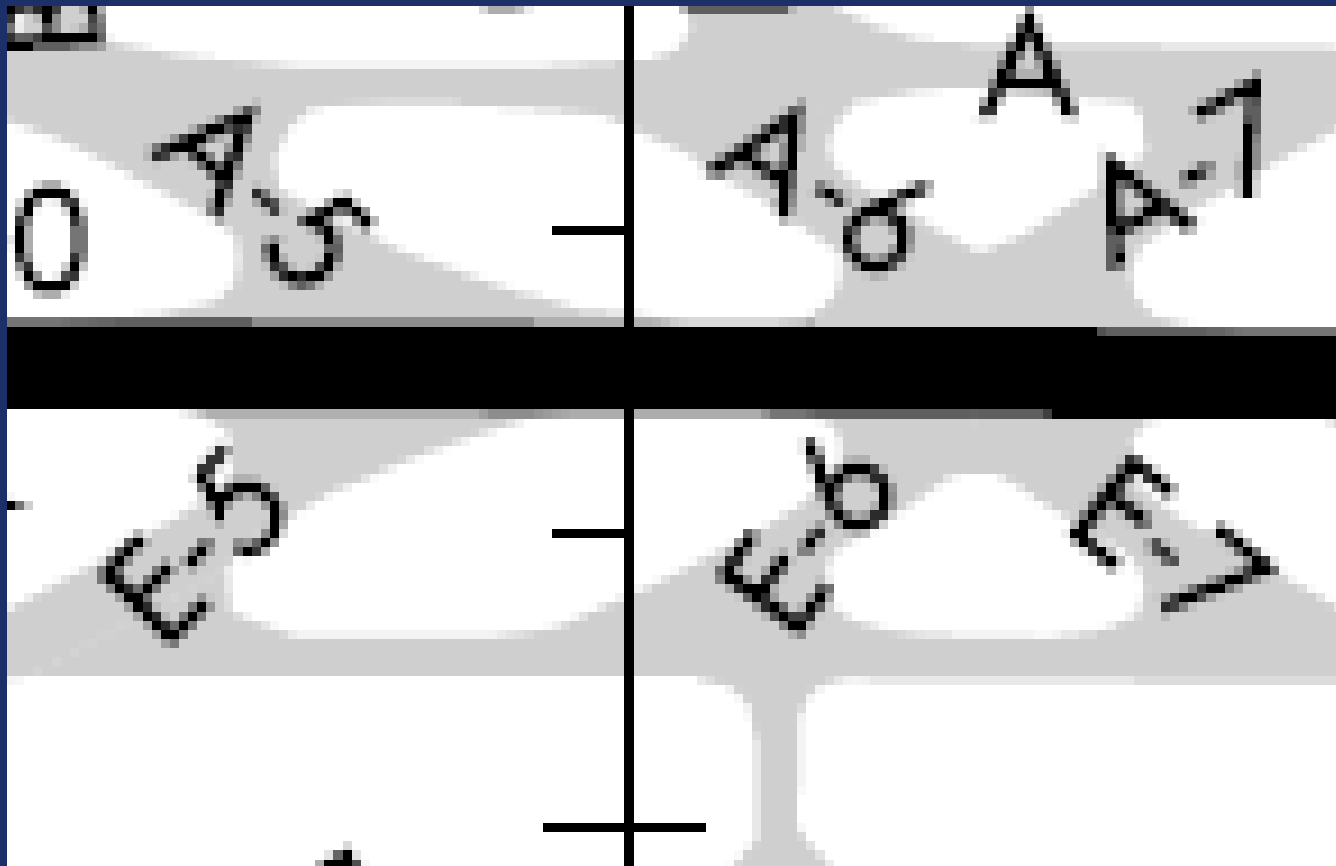
Design considerations

Avoid runway high-speed exit taxiways that exit in both directions from the same point

The exit taxiways should be separated to limit the pavement area at the intersection and make possible better signing and lighting



Avoid adjoining high speed exits going both directions



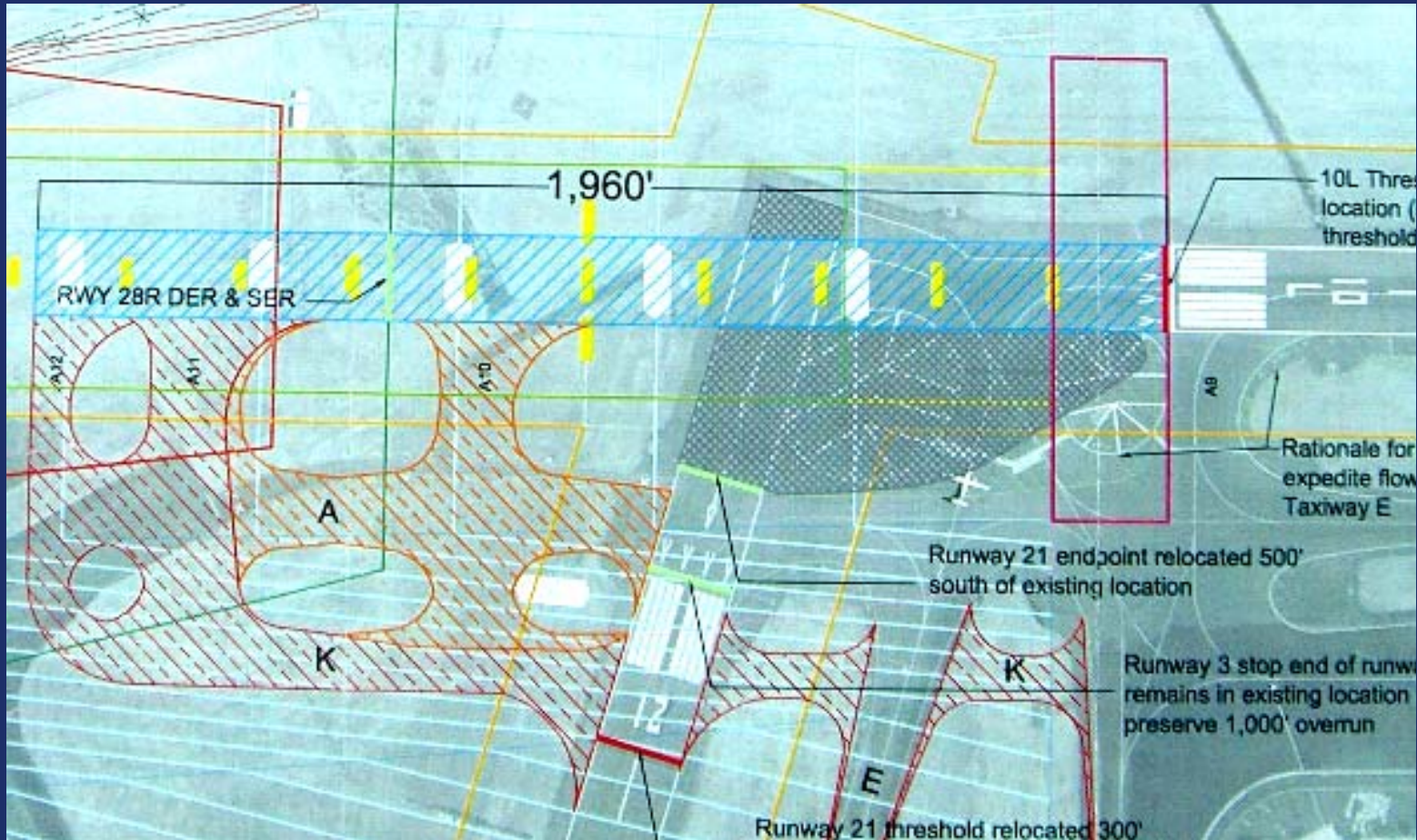
Design considerations

Consider the layout of Runway Holding Positions during taxiway planning

Reconfiguration of taxiways may be necessary or useful to provide adequate holding that does not interfere with taxiing aircraft



Consider Holds in Taxi Design





COMMUNICATION

- Pilot <=> Controller
- ATIS
- Ground operations
- Airport operator <=> Tenants
- Runway Safety Team



Airfield Construction

- **Between 1999 and 2004 there were 218 runway incursions or incidents related to airfield construction.**
- **Your project plans include a construction safety plan.**
 - Who's responsible?
 - What if something bad happens?
 - COMMUNICATE

communicate



Federal Aviation
Administration



RUNWAY SAFETY – EVERYONE'S RESPONSIBILITY